EXHIBIT 4

EXHIBIT 9


McCann
EXHIBIT NO. 1079
7.12.17
Andrea M. Ignacio
RPR,CRR,CCRR,CSR 9830

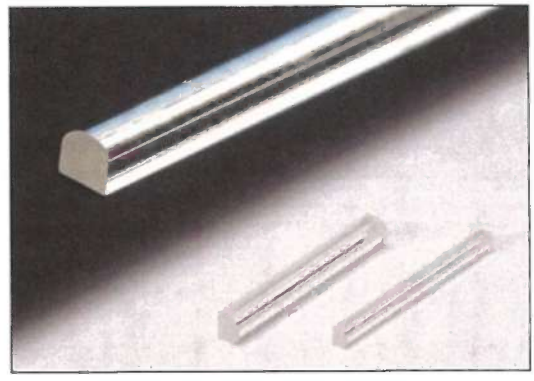
NEW

FAC LENS (Fast-Axis Collimating Lens)

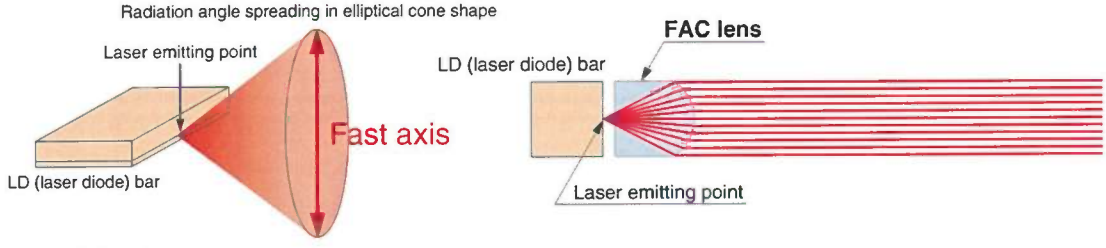
J10919 SERIES

OVERVIEW

The J10919 series FAC lens is an optical lens that collimates light spreading from a semiconductor laser in the fast-axis direction. Semiconductor lasers have a large divergence angle in the fast-axis direction, so the output light cannot be efficiently used unless collimated. The FAC lens collimates light spreading from a semiconductor laser into a narrow beam with a radiation angle of several milliradians (mrad) or less so that the diverging light can be efficiently utilized.



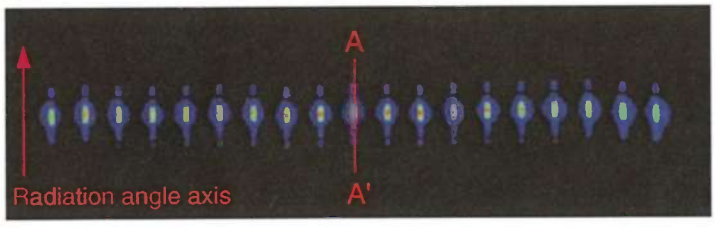
COLLIMATING LIGHT

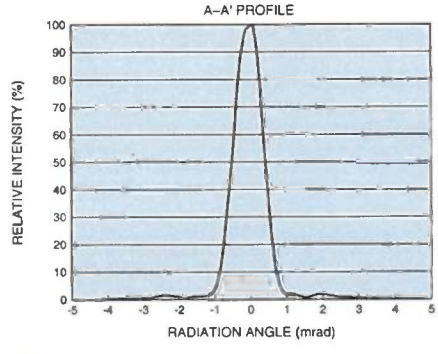


FEATURES

- **Aspheric micro-cylindrical lens**
- **Highly efficient utilization of light from LD bar**
- **Small variations in characteristics allow mass production**
- **Minimized smile and side lobes due to high-precision fabricating technology**

OUTPUT DISTRIBUTION IMAGE WHEN INSTALLED TO LD BAR





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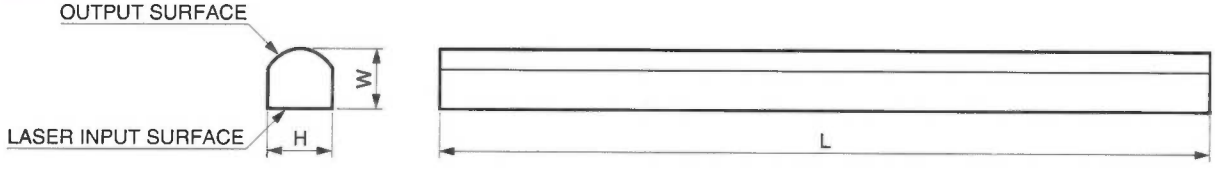
SPECIFICATIONS

Parameter		J10919-01	J10919-02	Unit
Material		High refractive index glass (developed in-house)		—
Design Wavelength		808		nm
Refractive Index at 808 nm		1.812		—
Length (L)		12.00		mm
Height (H)		1.00	1.50	mm
Width (W)		0.94	1.41	mm
Effective Focal Length (EFL)		0.61	0.92	mm
Back Focal Length (BFL)		0.10	0.15	mm
Effective Area		90 % of output area		—
Numeric Aperture (NA)	Min.	0.8		—
Coating		Anti-reflection film		—
Efficiency	Min.	85 (±1.5 mrad)	85 (±1.0 mrad)	%
Operating Ambient Temperature		-30 to +60		°C

DIMENSIONAL OUTLINES (Unit: mm)

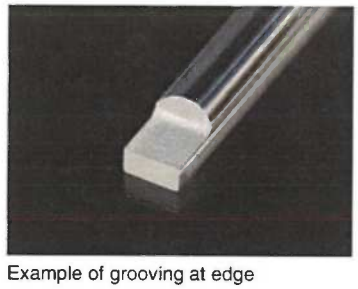


* See the above specification table for L, H and W.

MACHINING OPTIONS

- **Changing length**
- **Grooving at edge**
- **Changing focal length**
- **Changing design wavelength**

Please feel free to contact us for modification.



Example of grooving at edge

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Electron Tube Division
314-5, Shimokanzo, Iwata City, Shizuoka Pref., 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, P. O. Box 6910, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658 E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road Welwyn Garden City Hertfordshire AL7 1BW, United Kingdom, Telephone: 44-(0)1707-294888, Fax: 44(0)1707-325777 E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 SOLNA, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: Info@hamamatsu.se
Italy: Hamamatsu Photonics Italia: S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741 E-mail: Info@hamamatsu.it
China: HAMAMATSU PHOTONICS (CHINA) Co., Ltd.: 1201 Tower B, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn

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